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(54) Underpad for incontinent patients

Unterlage für inkontinente Patienten

Alaise pour patients incontinents

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(73) Proprietor: **PAPER-PAK PRODUCTS, INC.**
(a Delaware Corporation)
La Verne, California 91750 (US)

(72) Inventor: **Larsonneur, Lionel M.**
Pomona, California 91766 (US)

(74) Representative: **Smith, Philip Antony et al**
REDDIE & GROSE
16 Theobalds Road
London WC1X 8PL (GB)

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Description

Various articles such as rubber sheets and absorbent pads have been used in the beds of incontinent patients, primarily to protect the mattress against soilage. Rubber sheets are often extremely uncomfortable for the patient.

Hospital underpads have been developed as a preferable alternative to the rubber sheet. Since these underpads are more comfortable for the patient to lie on in direct contact with, they are placed on top of the lower sheet, thereby protecting it as well as the mattress. One type of hospital underpad which has long been on the market comprises a plurality of soft, fibrous tissue layers backed by a soft, waterproof polyethylene backing layer. The four edges of the backing layer are turned and/or sealed. The absorbent tissue layers are uniform and lump free, and provide maximum absorbency and dispersion of liquid. Runoff or leakage is prevented by virtue of the sealed edges. Instead of the fibrous tissue layers, some underpads are formed of packed tissue or fluffed wood pulp.

In an effort to improve the absorbent capability of hospital underpads, variations have been developed in which wood pulp is interspersed with the soft fibrous tissue layers. Sometimes, a super-absorbent powder is mixed with the wood pulp in homogeneous distribution within the pad. Unfortunately, if such pads are left with a patient too long, the filling with liquid develops a slimy combination of the wood pulp, super-absorbent powder and urine that is particularly likely to cause skin breakdown if left in contact with the patient's body. Thus such arrangements, even though more absorbent, still do not provide a completely satisfactory answer to the problem of developing an absorbent underpad for incontinent patients.

US-A-4212302 describes an absorbent pad with side margins which contain a super-absorbent material.

An absorbent underpad according to the present invention is defined in Claim 1.

In brief, an absorbent underpad of the present invention develops an enhanced capability for liquid absorption by virtue of its structure and its use of particular absorbent materials. The underpad of the present invention in its preferred form basically comprises an uppermost layer, a bottom or backing layer and a plurality of intermediate layers to establish the liquid absorbent capability of the pad. The backing layer may be a thin sheet of impervious polypropylene plastic, in which case the edges are not folded over on top of the uppermost layer of the pad but instead are adhered along the underside of the uppermost layer by separate narrow lines of glue extending along the two side edges of the pad between the two outermost layers.

The upper layer of the underpad is a porous layer, permeable to liquid, of open weave, spun-bonded sheet, hydrophobic material, preferably of polypropylene facing. Directly underneath that is a transfer layer of non-woven polyester hydrophilic material which allows liquid to pass through readily into the inner layers of the pad but impedes any passage of the liquid in the opposite direction. Next, along the inner side of the transfer layer, is an upper layer of tissue. The upper surface of the transfer layer, being next to the uppermost layer, tends to draw liquid through the open weave. However, the lower surface of the transfer layer, being next to the upper tissue layer, does not exhibit the same tendency, thus accounting for the directional transfer of liquid therethrough.

The upper tissue layer comprises a plurality of plies of thin, soft, fibrous tissue which are formed together to constitute the upper absorbent tissue layer next to the transfer layer. This combination of the one-way liquid passage effected by the transfer layer and the absorbency of the adjacent tissue layer achieves the very beneficial result that the pad develops a feeling of dryness along its upper surface, even though it may have only recently been wet.

Beneath the upper tissue layer and extending lengthwise of the underpad is, preferably, a pair of spatially separated strips of laminated super-absorbent polymer powder material. These laminated strips, preferably about 5 cm. wide and extending virtually the full length of the pad, serve as barriers to any liquid which passes by capillary action outward from the central region of the pad or inward from the side edge of the pad and complete the absorption of the liquid in the side areas of the pad which are generally outside the region where the patient's body rests. On the underside of these barrier strips is a lower tissue layer, essentially identical to the upper tissue layer.

The upper and lower tissue layers are formed of as many as ten plies of highly absorbent tissue, fabricated with a crepe construction which is aligned transversely of the pad to establish a preferential direction for the capillary action for liquid which is absorbed within the tissue layers. Together with the barrier strips between them, the upper and lower tissue layers form a sort of sandwich. The combination of the transversely directed wicking action in conjunction with the super-absorbent barrier strips along the sides of the pad serves to direct the liquid away from the central region of the pad, the area where the patient's body is most likely situated, to near the edges where the liquid is absorbed. Thus the central region of the pad is kept reasonably dry, even though the pad may have a substantial amount of liquid within it, and so enhancing the comfort of the patient who is lying on the pad and within the bed. As an added aspect of comfort to the patient, the removal of liquid from the center makes the upper facing layer feel dry to the touch.

The barrier strips are of laminated absorbent material, comprising upper and lower thin layers of absorbent tissue with super-absorbent powder distributed in a generally random fashion between them.

In one particular embodiment of an underpad in accordance with the present invention, the pad is approximately 75 cm. square. About 1.3 cm. in from

each side edge of the pad is a glue line extending the length of the pad, sometimes referred to as the "machine direction", which adheres the side edges of the pad together between the upper spun-bonded permeable sheet and the lower polypropylene plastic impervious backing layer. The internal components of the pad--the upper and lower tissue layers with the side barrier strips which make up the sandwich construction to direct the liquid flow within the pad--are closely contiguous to the side edge glue lines but terminate short of the top and bottom edges of the pad by about 6.3 cm. on each upper and lower edge. The tissue layers extend to within approximately 1.3 cm. of the side edges while the intermediate barrier strips are spaced about 7.5 to 10 cm. therefrom. This arrangement provides a region where the external surface layers are loosely and somewhat intermittently adhered together with sufficient space in the inner pad region to provide some leeway at the ends for the cutting blade as it separates the individual pads during fabrication. It will be understood that the pads are formed from rolls of the respective layer elements on a production line.

The upper, or inner, surface of the polypropylene backing layer is sticky, and this is effective to accomplish the adherence of the upper spun-bonded facing layer to the polypropylene backing layer at the longitudinal ends of the pad where these two layers come in contact. The stickiness of the inner surface of the polypropylene backing layer is accomplished by spraying glue fibers on the upper surface of the backing sheet at intervals along the production line corresponding to the interpad area where the slitting will occur. There is a slight overlap of the sticky surface with the location of the tissue layers within the pad so that the ends of the bottom tissue ply also adhere to the surface, thereby serving to hold the internal components of the pad in position.

In a second embodiment of the invention, the impervious backing layer is replaced by a non-woven, spun-bonded sheet which has a certain degree of porosity. In both embodiments, the upper facing layer comprises 14 gram spun-bonded material which is sprayed with a surfactant that facilitates the passage of liquid therethrough. The backing layer of the second embodiment, however, is formed of heavier 35 gram spun-bonded material without the surfactant treatment. This is almost impervious to water but is permeable to air. This second embodiment of the invention finds particular application in use with air beds, such as are used for burn victims, patients with ulcerated skin, etc. These air beds have a core of beads or sand which permits air at a slightly elevated pressure to flow through them from the bottom up, thereby assisting in drying the skin. The porosity of the heavier non-woven backing layer without any surfactant treatment is such that the pressurized air passes through, but only the slightest bit of moisture can penetrate the backing layer from the upper side. This serves to prevent any "strike through" of moisture from the pad to the bed.

During assembly of the constituent components of an underpad as it proceeds along the production line, the interior laminations of the upper and lower tissue layers with the side strip barriers between them are loosely secured together by longitudinal lines of pressure bond stitching spaced approximately 5 to 10 cm. apart. This pressure bond stitching is formed by running a serrated wheel under load along the tissue layers, thus penetrating and compressing them sufficiently to create the lines of pressure bonds.

The transfer layer is approximately as long as the tissue layer sandwich but is somewhat narrower, being located along the center of the pad, generally equidistant from the side edges. The width of the transfer layer is sufficient to overlap and cover the side barrier strips. In the particular 75 cm. square embodiment of the invention referred to hereinabove, the transfer layer is approximately 45 cm. wide and the side barrier strips are about 5 cm. wide and spaced about 15 cm. from the side edges, leaving a space between the strips of about 34 cm.

In the accompanying drawing:

FIG. 1 is a perspective view of a typical absorbent underpad of the prior art, shown in position on a bed;

FIG. 2 is a schematic plan view, partially broken away, of one particular arrangement in accordance with the present invention;

FIG. 3 is a schematic exploded view showing the various components of the arrangement of FIG. 2;

FIG. 4 is a schematic end elevation, in section, taken along the line 4-4 of FIG. 2 looking in the direction of the arrows;

FIG. 5 is an enlarged schematic view of a portion of a component of the arrangement of FIG. 2; and

FIG. 6 is a schematic end view of a particular element in the arrangement of FIG. 2.

As shown in FIG. 1, a conventional hospital underpad 10 of the prior art is positioned for use on the lower sheet 12 of a hospital bed 14. The underpad 10 comprises an absorbent central area 16 with sealed longitudinal edges 18 and lateral edges 20 which are formed by folding over the backing layer and sealing it along the upper edge surface of the upper sheet.

The schematic views of FIG. 2 (a partially broken away plan view) and FIG. 3 (an exploded view) show an underpad 100 of the invention comprising a backing layer 102 and an upper layer 104 between which are a transfer layer 106, an upper tissue layer 108, and a lower tissue layer 110, the tissue layers being separated by a pair of spaced-apart absorbent strips 112. The arrow 114 indicates the longitudinal direction of the underpad 100.

The upper spun-bonded sheet 104 is sufficiently open as to appear partially transparent, at least to the extent that the outline of the upper tissue layer 108 is discernible through it, particularly against the darker background of the blue polyethylene backing sheet 102

(see FIG. 2). The upper and lower sheets 104, 102 are secured together along the side edges 120, 122 by lines of glue 124, 126 and, at the top and bottom ends 121, 123, by the stickiness of the glue fibers sprayed on the inner surface of the backing layer 102 in the end regions 126, 128. The regions of sprayed glue fibers generally extend in the areas 126A and 128A, thereby providing a slight overlap with the tissue layers 108, 110 with the result that the lower tissue layer 110 adheres to the backing layer 102.

The transfer sheet 106 is shown in the breakaway view of FIG. 2 as being immediately beneath the upper facing sheet 104. The breakaway at line A corresponds to a peeling away of the upper facing sheet 104, thereby exposing the transfer sheet 106 overlying the upper tissue layer 108. The breakaway at line B corresponds to the peeling away of the transfer sheet 106 and the upper tissue layer 108 in the corner of the pad below the line B. This displays one of the barrier strips 112 having an overlap with the transfer sheet 106 (shown between lines A and B). The lower tissue layer 110 is shown below the barrier strip 112. An optional second barrier strip 112A is indicated by broken line outline alongside the strip 112. The relative juxtaposition of the respective elements making up an underpad 100 may be clarified by reference to the end sectional view of FIG. 4.

The crepe construction of the tissue layers 108, 110 is represented in the enlarged schematic view of FIG. 5. This shows a portion 130 of one of the plies of the tissue layer 108 or 110 having an irregular, crepe-like surface with numerous surface irregularities 132 in the form of embossments and depressions. These are generally aligned in the transverse direction and are created by running the individual tissue plies in the transverse direction over a doctor blade configured to develop the crepe irregularities 132 of FIG. 5. As a consequence of this surface configuration, moisture which is absorbed in the tissue layers is directed by capillary action to migrate in the transverse direction of the pad 100 toward a barrier strip 112. Since the super-absorbent barrier strip readily soaks up any moisture which reaches it through the tissue layers 108, 110, a gradient wicking action in the tissue layers channels the liquid in the transverse direction toward the barrier strip 112 associated therewith.

The construction of a barrier strip 112 is illustrated schematically in FIG. 6. As shown therein, the strip 112 comprises an upper layer 140 and a lower layer 142 which carry between them, generally randomly distributed throughout, a plurality of clumps 144 of super-absorbent powder. The strips 140, 142 with the powder between them are pressed together so as to serve as a carrier for the super-absorbent powder. Because of this structural configuration, the strips 112 effectively serve as a barrier to any liquid against passing a strip 112, at least until the strip 112 is fully saturated.

A second embodiment of the invention as described hereinabove may be represented by the same drawing FIGS. 1-5 used to show the first embodiment, since the appearance as depicted is essentially the same. The difference resides in the backing layer 102 which for the second embodiment is designated 160. Instead of being impervious polypropylene as in the first embodiment, the backing layer is a heavier sheet of spun-bonded material, untreated with a surfactant such as that used in the upper facing sheet 104, which is permeable to air at an elevated pressure but resistant to the transfer of water. This finds application on air beds for burn patients, the elderly, etc.

Arrangements in accordance with the invention are capable of absorbing a substantial quantity of liquid while still feeling dry to the touch and thus provide an effective underpad for the stated purpose. These pads have been found to be more effective than those which are known heretofore. A quantity of water equal to the contents of two coffee cups may be poured into the center of one of these pads and it will be totally absorbed within a very short time, leaving the surface of the upper facing layer essentially dry to the touch. This high liquid absorption capability is the result of the materials used, the components employed in the pad and the structural configuration of the respective elements.

This is a considerable improvement over pads which use wood fiber fluff as the absorbent material, even when it is mixed with super-absorbent powder. In the fluff pads, the fibers are not connected and the water tends to puddle, sometimes interacting with the super-absorbent powder to develop a slime along the surface of the pad. The laminated barrier strips of the present pads prevent the water from going through, thereby eliminating the likelihood of hydraulic pressure from weight of the patient's body on the absorbent material forcing liquid through the backing layer to contaminate the air bed with which it is used.

Claims

1. An absorbent underpad (10, 100) for use in protecting bedding or the like, the underpad having a plurality of absorbent tissue layers (108, 110) sandwiched between an impervious backing layer (102) and a liquid permeable upper facing layer (104) which are adhered to each other along at least their side edges (120, 122) to retain liquid within the underpad, and a plurality of generally parallel barrier strips (112) situated between upper and lower tissue layers (108, 110), the barrier strips (112) being oriented generally parallel to the side edges (120, 122) of the underpad and positioned on opposite sides of the center of the underpad, characterised in that the barrier strips are spaced from the said side edges, and each of said tissue layers constitutes a plurality of plies of highly absorbent tissue which are formed to establish a selectively directed capillary action for liquid absorbed therein.

2. An absorbent underpad according to Claim 1, characterised in that the direction of capillary action is from the center of the underpad outward toward the barrier strips (112) and from the side edges (120, 122) inward toward the barrier strips.

3. An absorbent underpad according to Claim 1 or Claim 2, characterised by the selectively directed capillary action being established by a plurality of creped tissue plies in which the crepe direction is oriented transversely of the underpad.

4. An absorbent underpad according to Claim 3, characterised in that the creped tissue plies incorporate surface irregularities which are oriented generally orthogonal to the barrier strips (112).

5. An absorbent underpad according to any of Claims 1 to 4, characterised by a transfer layer (106) located between the upper tissue layer (108) and the upper facing layer (104), which transfer layer is formed to develop preferential directional transmissibility of liquid therethrough.

6. An absorbent underpad according to any of Claims 1 to 5, characterised in that the barrier strips (112) are two in number, each being formed of laminated tissue layers (140, 142) with clumps (144) of super-absorbent powder distributed therein.

7. An absorbent underpad according to any of Claims 1 to 5, characterised in that the said strips (112) are positioned in two pairs located on opposite sides of the center region of the underpad, each of said strips being formed of laminated tissue layers with clumps of super-absorbent powder distribution therein.

8. An absorbent underpad according to any of Claims 1 to 7, characterised in that the upper facing layer (104) is formed of spun-bonded polypropylene with a sufficiently open fiber distribution to render it slightly transparent.

9. An absorbent underpad according to Claims 1 to 8, characterised in that the upper facing layer (104) is treated with a surfactant to improve its porosity for liquid.

10. An absorbent underpad according to any of Claims 1 t 9, characterised in that the backing sheet (102) comprises a spun-bonded polypropylene layer of heavier material than the upper facing sheet (104), further characterized by the backing sheet being permeable to air but generally impervious to liquid such as to admit air at an elevated pressure to the interior of the underpad from the underside.

Patentansprüche

1. Absorbierende Unterlage (10, 100) zur Verwendung zum Schutz von Bettzeug und dergleichen, wobei die Unterlage mehrere absorbierende Tissuelagen (108, 110) zwischen einer undurchlässigen Trägerlage (102) und einer flüssigkeitsdurchlässigen oberen Decklage (104), die zumindest entlang ihrer Seitenräder (120, 122) aneinandergeklebt sind, um Flüssigkeit in der Unterlage festzuhalten, sowie mehrere allgemein parallele Sperrstreifen (112), die sich zwischen der oberen und unteren Tissuelage (108, 110) befinden, aufweist, wobei die Sperrstreifen (112) allgemein parallel zu den Seitenrändern (120, 122) der Unterlage ausgerichtet und auf einander gegenüberliegenden Seiten der Mitte der Unterlage positioniert sind, dadurch gekennzeichnet, daß die Sperrstreifen von den Seitenrändern beabstandet sind und jede der Tissuelagen aus mehreren Schichten hochabsorbierendem Tissuegewebe besteht, die zur Herstellung einer gezielt gerichteten Kapillarwirkung für darin absorbierte Flüssigkeit gebildet sind.

2. Absorbierende Unterlage nach Anspruch 1, dadurch gekennzeichnet, daß die Richtung der Kapillarwirkung von der Mitte der Unterlage nach außen zu den Sperrstreifen (112) und von den Seitenrändern (120, 122) nach innen zu den Sperrstreifen verläuft.

3. Absorbierende Unterlage nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die gezielt gerichtete Kapillarwirkung durch mehrere gekreppte Tissueschichten erzielt wird, wobei die Krepprichtung quer zur Unterlage ausgerichtet ist.

4. Absorbierende Unterlage nach Anspruch 3, dadurch gekennzeichnet, daß in den gekreppten Tissueschichten Oberflächenunregelmäßigkeiten enthalten sind, die allgemein orthogonal zu den Sperrstreifen (112) ausgerichtet sind.

5. Absorbierende Unterlage nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß zwischen der oberen Tissuelage (108) und der oberen Decklage (104) eine Transferlage (106) angeordnet ist, die zur Entwicklung einer Durchlässigkeit in eine Vorzugsrichtung ausgebildet ist.

6. Absorbierende Unterlage nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß von den Sperrstreifen (112) zwei vorhanden sind, wobei jeder aus laminierten Tissuelagen (140, 142) ausgebildet ist, in denen größere Ansammlungen (144) von pulverförmigem Superabsorber verteilt sind.

7. Absorbierende Unterlage nach einem der Ansprü-

che 1 bis 5, dadurch gekennzeichnet, daß die Streifen (112) in zwei Paaren angeordnet sind, die auf einander gegenüberliegenden Seiten des Mittelbereichs der Unterlage positioniert sind, wobei die Streifen jeweils aus laminierten Tissuelagen gebildet sind, in denen größere Ansammlungen von pulverförmigem Superabsorber verteilt sind.

8. Ansorbierende Unterlage nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die obere Decklage (104) aus Spinnvlies aus Polypropylen mit einer zur Erzielung einer leichten Durchsichtigkeit ausreichend offenen Faserverteilung ausgebildet ist.

9. Ansorbierende Unterlage nach den Ansprüchen 1 bis 8, dadurch gekennzeichnet, daß die obere Decklage (104) zur Verbesserung ihrer Porosität für Flüssigkeit mit einer oberflächenaktiven Substanz behandelt worden ist.

10. Absorbierende Unterlage nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß die Trägerbahn (102) eine Lage aus Spinnvlies aus Polypropylen aus einem schwereren Material als die obere Deckbahn (104) umfaßt, weiterhin dadurch gekennzeichnet, daß die Trägerbahn luftdurchlässig, aber allgemein flüssigkeitsundurchlässig ist, so daß Luft mit einem erhöhten Druck von der Unterseite ins Innere der Unterlage eingelassen wird.

Revendications

1. Alaise absorbante (10, 100) à utiliser pour protéger la literie ou similaire, l'alaise présentant plusieurs couches de papier absorbant (108, 110) en sandwich entre une couche imperméable dorsale (102) et une couche perméable aux liquides (104) tournée vers le haut, qui sont collées les unes aux autres le long d'au moins leurs bords latéraux (120, 122) pour retenir des liquides à l'intérieur de l'alaise, et plusieurs bandes de barrière (112) généralement parallèles situées entre la couche supérieure et la couche inférieure de papier absorbant (108, 110), les bandes de barrière (112) étant orientées de manière générale en parallèle aux bords latéraux (120, 122) de l'alaise et disposées sur les côtés opposés du centre de l'alaise, caractérisée en ce que les bandes de barrière sont espacées desdits bords latéraux, et chacune desdites couches de papier absorbant est constituée de plusieurs épaisseurs de papier hautement absorbant, qui sont configurées de manière à établir pour le liquide qui y est absorbé une action capillaire dirigée de manière sélective.

2. Alaise absorbante selon la revendication 1, caractérisée en ce que l'action capillaire est dirigée vers l'extérieur à partir du centre de l'alaise, en direction des bandes de barrière (112), et vers l'intérieur à partir des bords latéraux (120, 122) en direction des bandes de barrière.

3. Alaise absorbante selon la revendication 1 ou la revendication 2, caractérisée par le fait que l'action capillaire dirigée de manière sélective est établie par plusieurs épaisseurs de papier crêpé dont la direction du crêpage est orientée transversalement par rapport à l'alaise.

4. Alaise absorbante selon la revendication 3, caractérisée en ce que les épaisseurs de papier crêpé comportent des irrégularités de surface qui sont orientées de manière généralement orthogonale aux bandes de barrière (112).

5. Alaise absorbante selon l'une quelconque des revendications 1 à 4, caractérisée par une couche de transfert (106) située entre la couche supérieure de papier absorbant (108) et la couche (104) tournée vers le haut, laquelle couche de transfert étant configurée pour que s'y développe une aptitude à une transmission du liquide dans une direction préférentielle.

6. Alaise absorbante selon l'une quelconque des revendications 1 à 5, caractérisée en ce que les bandes de barrière (112) sont au nombre de deux, chacune étant formée de couches stratifiées de papier absorbant (140, 142) dans lesquelles sont distribués des amas (144) de poudre superabsorbante.

7. Alaise absorbante selon l'une quelconque des revendications 1 à 5, caractérisée en ce que lesdites bandes (112) sont disposées en deux paires situées sur des côtés opposés de la région centrale de l'alaise, chacune desdites bandes étant formée de couches stratifiées de papier absorbant dans lesquelles sont distribués des amas de poudre superabsorbante.

8. Alaise absorbante selon l'une quelconque des revendications 1 à 7, caractérisée en ce que la couche (104) tournée vers le haut est formée d'un nontissé en polypropylène dont la distribution des fibres est suffisamment ouverte pour qu'elle soit légèrement transparente.

9. Alaise absorbante selon les revendications 1 à 8, caractérisée en ce que la couche (104) tournée vers le haut est traitée avec un agent tensio-actif pour améliorer sa porosité vis-à-vis des liquides.

10. Alaise absorbante selon l'une quelconque des revendications 1 à 9, caractérisée en ce que la feuille de dos (102) comporte une couche de non-

tissé en polypropylène d'un matériau plus dense que la feuille (104) tournée vers le haut, et caractérisée en outre par le fait que la feuille de dos est perméable à l'air mais de manière générale imperméable aux liquides, de manière à permettre l'introduction d'air, par la face inférieure, à pression élevée à l'intérieur de l'alaise.

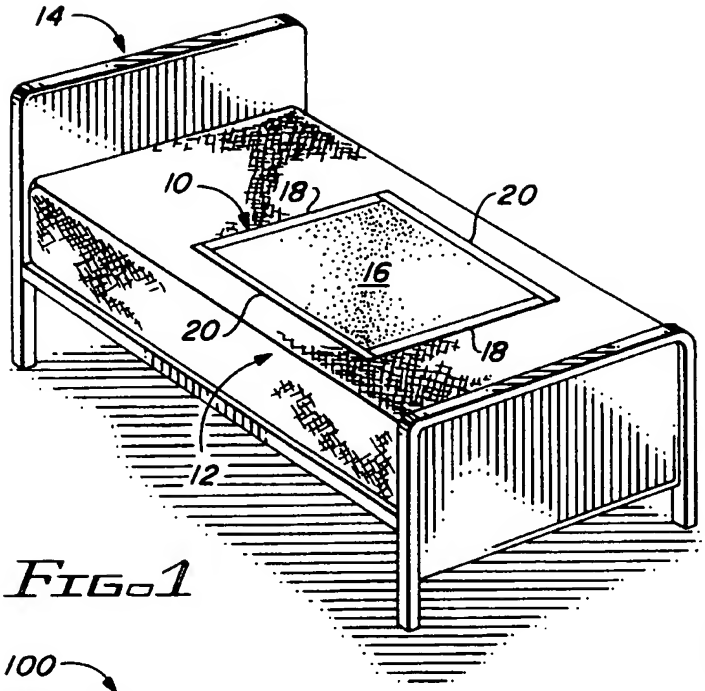

FIG. 1

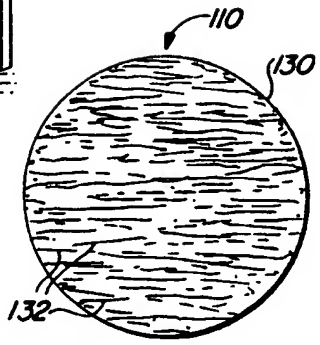

FIG. 5

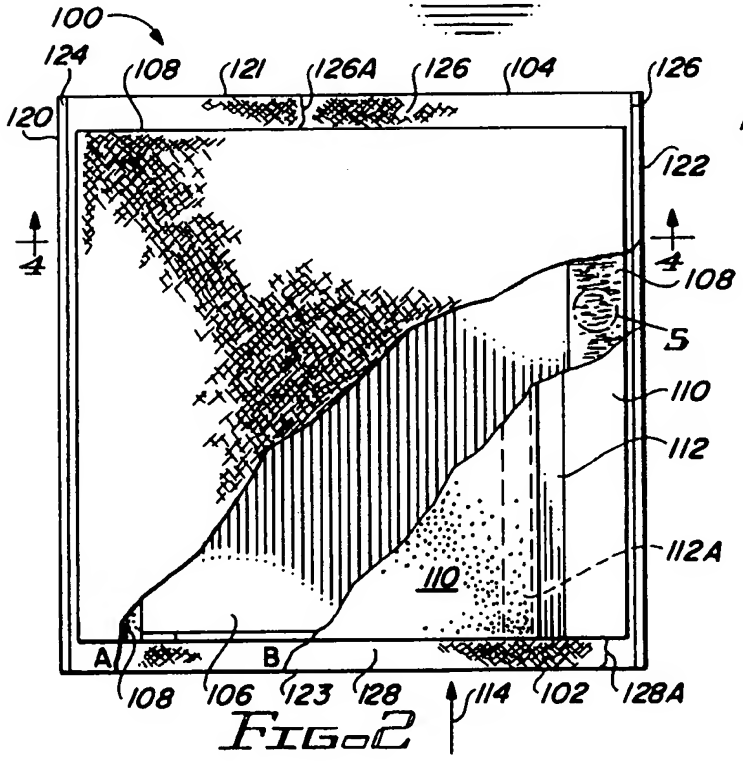

FIG. 2

FIG. 6

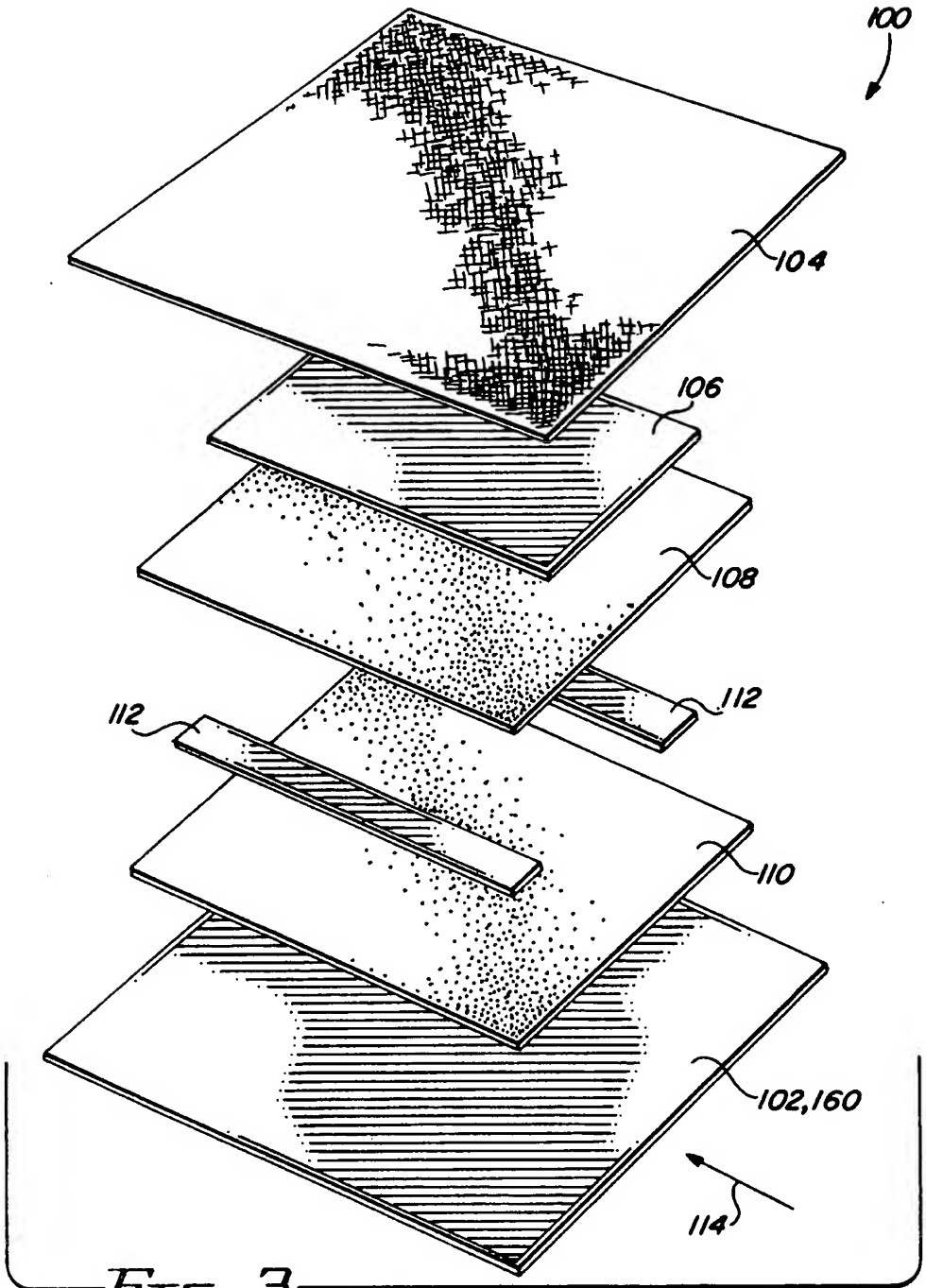
100
104
106
108
112
112
110
102,160
114

FIG-3

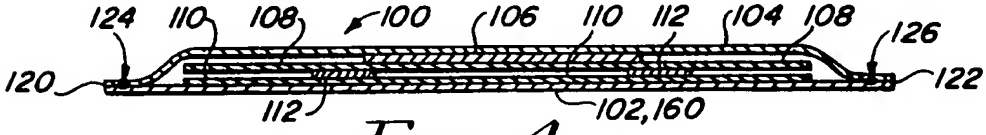
124
110
108
100
106
110
112
104
108
126
120
122
112
102,160

FIG-4